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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,032	02/20/2004	Cecile Aulnette	4717-11900	1662
28765	7590	06/09/2005	EXAMINER	
WINSTON & STRAWN LLP 1700 K STREET, N.W. WASHINGTON, DC 20006			SARKAR, ASOK K	
			ART UNIT	PAPER NUMBER
			2891	

DATE MAILED: 06/09/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/784,032	Applicant(s) AULNETTE ET AL.	
	Examiner Asok K. Sarkar	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2004.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 February 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>2/2004 and 5/2004</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 – 2, 4, 5, 7 – 14 and 17 – 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Kub, US 6,328,796.

Regarding claim 1, Kub teaches a method of producing a semiconductor structure having at least one support substrate and an ultrathin layer comprising:

- bonding a support substrate to a source substrate, wherein the source substrate includes a front face and a zone of weakness below the front face that defines an useful layer, the useful layer being of sufficient thickness to withstand heat treatments without forming defects therein so that it can be reduced in thickness to form the ultrathin layer in column 11, lines 13 – 24 and also detailed descriptions in columns 8 – 10;
- detaching the useful layer along the zone of weakness to obtain an intermediate structure including at least the transferred useful layer and the support substrate in column 11, lines 44 – 52; and
- treating the transferred useful layer to obtain an ultrathin layer on the support substrate that is suitable for use in applications in the fields of electronics, optoelectronics or optics in column 11, lines 54 – 55.

Regarding claim 2, Kub teaches providing an intermediate layer on the source substrate before the bonding step such that, after the detaching step, an alternate intermediate structure is obtained that includes the support substrate, the intermediate layer and the useful layer in column 11, lines 19 – 21.

Regarding claims 4 and 5, Kub teaches the intermediate layer made of insulating material such as oxide or nitride in column 9, lines 35 – 40.

Regarding claims 7 – 9, Kub teaches the useful layer less than 50 – 300 nanometers thick in column 3, lines 36 – 46.

Regarding claim 10, Kub teaches further treating the transferred useful layer by using at least one of chemical-mechanical polishing, sacrificial oxidation, and chemical etching in column 3, lines 36 – 46.

Regarding claim 11, Kub teaches heat annealing conducted after the bonding step and before the treatment step in column 11, lines 25 – 35.

Regarding claim 12, Kub teaches the heat annealing is conducted during the detaching step in column 11, lines 45 – 50.

Regarding claim 13, Kub teaches the heat annealing is conducted before the detaching step in column 11, lines 25 – 35.

Regarding claim 13, Kub teaches providing the zone of weakness by atomic species implantation in column 11, lines 22 – 24.

Regarding claim 16, Kub teaches applying at least one of mechanical and thermal stresses during the detaching step in column 11, lines 44 – 52.

Art Unit: 2891

Regarding claim 17, Kub teaches etching out the cavities to make a smooth surface before bonding in between column 3, line 48 and column 4, line 52.

Regarding claim 18, Kub teaches SiC source substrate in column 8, lines 36 – 50.

Regarding claim 19, Kub teaches SiC support substrate in column 9, lines 14 – 25.

3. Claims 1 – 2, 4, 5 and 7 – 19 are rejected under 35 U.S.C. 102(b) as being anticipated by Henley, US 6,500,732.

Limitations of these claims are also taught by Henley as explained throughout the disclosure.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Art Unit: 2891

6. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kub, US 6,328,796.

Regarding claim 3, Kub teaches forming a thin intermediate layer in column 9, lines 35 – 37, but fails to teach thickness of the intermediate layer below 50 nanometers.

However, given the substantial teaching of Kub, it would have been obvious to one with ordinary skill in the art at the time of the invention to judiciously adjust and control thickness of the intermediate layer below 50 nanometers process through routine experimentation and optimization to achieve optimum benefits in terms of bonding the two substrates as described in column 7, lines 5 – 21 (see MPEP 2144.05) and it would not yield any unexpected results.

Regarding claim 6, Kub fails to teach thickness of the useful layer being at least 3 times thicker than the ultrathin layer before treatment.

However, given the substantial teaching of Kub, it would have been obvious to one with ordinary skill in the art at the time of the invention to judiciously adjust and control thickness of the useful layer being at least 3 times thicker than the final device or the ultrathin layer since, the cleaving and the polishing/etching treatments will require a substantial polishing of the cleaved layer before a final thin layer is produced.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kub, US 6,328,796 in view of Henley, US 6,500,732.

Kub fails to teach providing a zone of weakness as a porous layer in the source substrate.

Henley teaches that thin layer on SOI can also be prepared by providing a zone of weakness as a porous layer in the source substrate for the benefit of providing high degree of etch selectivity between the epitaxial and the porous silicon layers in column 2, lines 44 – 56.

Therefore, it would have been obvious to one with ordinary skill in the art at the time of the invention to providing a zone of weakness as a porous layer in the source substrate especially if an SOI wafer is fabricated for the benefit of providing high degree of etch selectivity between the epitaxial and the porous silicon layers as taught by Henley in column 2, lines 44 – 56.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Asok K. Sarkar whose telephone number is 571 272 1970. The examiner can normally be reached on Monday - Friday (8 AM- 5 PM).

Art Unit: 2891

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, William B. Baumeister can be reached on 571 272 1722. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Asok Kumar Sarkar

Asok K. Sarkar

June 7, 2005

Primary Examiner